

**Attachment**

**Opposition Brief**  
**(Translation)**

**Date of Instituting Opposition:** 30 June 2004

**Serial No. of Pat. Appln. Under Opposition:** 090104895P01

**Serial No. of Publication of Pat. Appln. Under Opposition:** 581833

**Title of Invention:** PARTIALLY ORIENTED POLY(TRIMETHYLENE  
TEREPHTHALATE) YARN

**The Opposer:** SOLOTEX Corporation (Japan)

**The Opposed Applicant:** E. I. Du Pont de Nemours and Company

**Reasons for Opposition:**

I. Serial No. of Pat. Appln. Under Opposition: 090104895P01

II. The Patent Application Under Opposition ("Opposed Application"):

Publication No.: 581833

Application No. 090104895

Title of Invention: PARTIALLY ORIENTED POLY(TRIMETHYLENE  
TEREPHTHALATE) YARN

Applicant: E. I. Du Pont de Nemours and Company

Publication Date: 1 April 2004

Priority Claim: US 09/518,732

Priority Date: 3 March 2000

III. Attachments:

(1) Evidence A1

JP 57-193534, entitled "CRIMPED YARN" (*already sent to Pro*)

Publication Date: 27 November 1982

Application No.: JP 56-63405

Filing Date: 28 April 1981

(2) Evidence A2

JP 49-013457, entitled "FRICTION FALSE-TWISTING DEVICE"

Publication Date: 5 February 1974

Application No.: JP 48-33061

Filing Date: 22 March 1973

(3) The published specification of the patent application under opposition

IV. Brief

(1) The inventive summary of the Opposed Application

The Opposed Application relates to an invention of partially oriented poly(trimethylene terephthalate) yarn ("PTT yarn"). The Opposed Application aims to provide a partially oriented PTT yarn with ageing over time and a process for false-twisting a partially oriented PTT yarn (see the publication specification of the Opposed Application, page 3, lines 3 to 7).

Particularly, the Opposed Application render the partially oriented PTT yarn which contracts over time suitable for false-twist processing by specifying the partially oriented yarn with an intrinsic viscosity of 0.70 to 1.5 dl/g and an elongation to break of 110 to 145 % (see Claim 1). The partially oriented PTT yarn described in the Opposed Application is prepared at a low spinning speed of 1650 to 2600 m/min and certain conditions (see Claim 6). Moreover, the patent application provides a process for continuous draw-texturing a partially oriented PTT yarn (see Claim 8).

(2) Reasons why the patentability of the Opposed Application should be negated.

1. Conclusion

All contents recited in Claims 1 to 5 of the Opposed Application, referring to a partially oriented PTT yarn, have been disclosed in Evidence A1 and are well known. Therefore, Claims 1 to 5 do not have novelty.

All contents recited in Claims 6 and 7 of the Opposed Application, referring to a process for producing a partially oriented PTT yarn, and those of Claim 8 of the Opposed Application, referring to a process for draw false-twisting a partially oriented PTT yarn, have been disclosed in Evidence A1 and are well known. Therefore, Claims 6 to 8 do not have novelty.

Claims 9 to 22 of the Opposed Application depend from Claim 6 or 8 and thus all contents of Claims 9 to 22 have been disclosed in Evidence A1, or are obvious to persons having ordinary skill in the art based on the teachings of Evidence A1 and Evidence A2. Therefore, Claims 9 to 22 do not have novelty or inventive step.

Consequently, Claims 1 to 22 of the Opposed Application lack novelty and inventive step and should not be granted a patent.

2. Comparison between the Opposed Application and Evidence (Evidence A1 and Evidence A2)

(2-1) Claims 1 to 5 of the Opposed Application (a partially oriented PTT yarn)

- (a) Claim 1 of the Opposed Application is directed to an invention of a partially oriented PTT yarn comprising Elements i) to iii) listed in the following Table 1.

In a further aspect, Evidence A1 aims to provide a crimp yarn having high crimp performance by false-twisting a specific polypropylene terephthalate (which is identical to PTT in definition) under certain conditions.

As shown in Table 1, Example 2 provided in Evidence A1 discloses a partially oriented PTT yarn satisfying Elements i) to iii) defined in Claim 1 of the Opposed Application.

Consequently, all contents described in Claim 1 have been disclosed in Evidence A1 and are well known. Therefore, Claim 1 does not have novelty.

Table 1

Claim 1 of the Opposed Application		Example 2 provided in Evidence A1
i) Components of the polymer	85 to 100 mol% of PTT	100 mol% of PTT
ii) Intrinsic viscosity of PTT polymer	0.70 to 1.5 dl/g	0.97 dl/g
iii) Elongation to break of a partially oriented yarn	110 to 145 %	142%

The comparison between the contents recited in Claim 1 of the Opposed Application and the disclosures of Evidence A1 is more clearly explained as follows:

Regarding Elements i) and ii)

Example 2 provided in Evidence A1 describes that "A ... unstretched strand ... was obtained with the same polymer, using the same spinneret, and under the same temperature conditions as in Application Example 1."

Furthermore, Example 1 provided in Evidence A1 describes that the used polymer is obtained by polycondensing dimethyl terephthalate and trimethylene glycol in the presence of a catalyst (see Evidence A1, column 12, lines 7 to 8 in Japanese version and page 11, lines 6 to 8 in the English translation attached to your September 21 e-mail ("English version")). In other words, Evidence A1 discloses a polymer which is composed of 100 mol% of poly(trimethylene terephthalate) recurring units, i.e., a polymer having 100 mol% of PTT.

Therefore, the contents recited in Claim 1 of the Opposed Application have been disclosed in Evidence A1 and are well known.

Moreover, Example 1 provided in Evidence A1 uses a PTT polymer having an intrinsic viscosity of 0.97 dl/g (see the column "intrinsic viscosity of chips" for Polymer No.P-4 listed in Table 1 of Evidence A1). Thus, Element ii) described in Claim 1 of the Opposed Application is disclosed in Evidence A1 and is well known.

Regarding Element iii)

Example 2 provided in Evidence A1 describes that "the unstretched strand having an elongation to break of 142 % was obtained ... at a take-up rate of 2500 m/min." Therefore, Element iii) defined in Claim 1 of the Opposed Application has been disclosed in Evidence A1 and is well known. Moreover, the "unstretched stand" described in Evidence A1 is identical in meaning to the "partially oriented yarn" indicated in the Opposed Application in view of the spinning rate (1650 to 2500 m/min).

Given the above, all contents recited in Claim 1 have been disclosed in Evidence A1 and are well known. Therefore, Claim 1 does not have novelty.

Furthermore, as further indicated below, the effect alleged by the Opposed Application can be known according to the teachings of Evidence A1 and is well known. The Opposed Application provides no novel or non-obvious contents.

The partially oriented yarn described in the Opposed Application exhibits stability, i.e., low change over time (see the publication English specification of the Opposed Application, page 2, lines 4 to 7 and page 3, lines 3 to 4).

Moreover, Evidence A1 mentions in column 9, lines 10 to 17 in Japanese version (page 9, paragraph 1 in English version) that in order to minimize the change over time in the unstretched yarn (i.e., partially oriented yarn), the spinning and take-up rate is 2000 m/min. Since the partially oriented yarn exemplified in Example 2 provided in Evidence A1 is spun at a take-up rate of 2500 m/min, it is a stable partially oriented PTT yarn with extremely low change over time. That is, the effect alleged in the Opposed Application has been disclosed in Evidence A1 and is well known.

As indicated above, the contents recited in Claim 1 of the Opposed Application and the effect attained thereby are completely identical to those disclosed in Evidence A1.

- (b) Claims 2 and 3 of the Opposed Application further limit the elongation to break defined in Claim 1 to 120 to 145 % and 130 to

145 %, respectively. However, as explained in Point (a), the partially oriented PTT yarn exemplified in Example 2 of Evidence A1 has an elongation to break of 142 %, which is within the above ranges. Therefore, the contents recited in Claims 2 and 3 have been disclosed in Evidence A1 and are well known. Therefore, Claims 2 and 3 do not have novelty.

- (c) Claims 4 and 5 of the Opposed Application further limit the intrinsic viscosity defined in Claim 1 to 0.9 to 1.5 dl/g and 0.9 to 1.2 dl/g, respectively. Thus, as explained in Point (a), Example 1 provided in Evidence A1 utilizes a PTT polymer having an intrinsic viscosity of 0.97 dl/g to be the feedstock for preparing a partially oriented PTT yarn. The value of 0.97 dl/g is within the ranges limited in Claims 4 and 5 of the Opposed Application. Thus, the contents recited in Claims 4 and 5 have been disclosed in Evidence A1 and are well known. Therefore, Claims 4 and 5 do not have novelty.

As indicated above, the contents recited in Claims 1 to 5 of the Opposed Application are completely identical to those disclosed in Evidence A1. Claims 1 to 5 do not have novelty and should not be granted a patent.

(2-2) Claims 6 and 7 of the Opposed Application (a process for producing a partially oriented PTT yarn)

- (a) Claim 6 of the Opposed Application is directed to a process for producing a partially oriented PTT yarn comprising Elements i), ii), iv), and v) listed in the following Table 2.

Furthermore, as stated in Point (2-1) (a), Evidence A1 discloses a PTT polymer satisfying Elements i) and ii) and indicates that it is preferred to spin the yarn at a spinning and take-up rate of at least 2000 m/min (Evidence A1, column 9, lines 10 to 17 in Japanese version and page 9, paragraph 1 in English version) and under spinning temperature of 245°C (Evidence A1, column 8, lines 16 to 20 in Japanese version and page 8, paragraph 3 in English version) so that the partially oriented PTT yarn which contracts over time still can be suitable for false-twisting process to produce a textured yarn.

The comparison between the above disclosures of Evidence A1 and the contents recited in Claim 6 of the Opposed Application is listed in Table 2. It can be apparently known from Table 2 that all contents recited in Claim 6 of the Opposed Application have been disclosed in Evidence A1 and are well known. Thus, Claim 6 does not have novelty.

Table 2

Claim 6 of the Opposed Application		Evidence A1		
		Text		Example 2
i) Components of the polymer	85 to 100 mol % of PTT	at least 50 mol % of PTT	Claim 1	100 mol % of PTT
ii) Intrinsic viscosity of PTT polymer	0.7 to 1.5 dl/g	at least 0.7 dl/g		0.97 dl/g
iv) spinning speed	1650 to 2600 m/min	at least 2000 m/min	column 9, lines 10 to 17	2500 m/min
v) spinning temperature of spinneret	250 to 270 °C	at least 245 °C	column 8, lines 16 to 20	260°C

(b) Claim 7 of the Opposed Application limits the spinning speed defined in Claim 6 to 1650 to 2300 m/min. As indicated above, Evidence A1 describes that it is preferred to spin a yarn at a spinning and take-up rate of at least 2000 m/min (see Evidence A1, column 9, lines 10 to 17 in Japanese version and page 9, paragraph 1 in English version). Consequently, the contents recited in Claim 7 have been disclosed in Evidence A1 and are well known. Therefore, Claim 7 does not have novelty.

(2-3) Claim 8 of the Opposed Application (a process for false-twisting a partially oriented PTT yarn)

Claim 8 of the Opposed Application is directed to a process for false-twisting a partially oriented PTT yarn comprising Steps a) to c) listed in the following Table 3.

Additionally, Evidence A1 describes the utilization of certain heating temperature of false-twisting and number of false twists as false-twisting conditions to obtain a yarn having high crimping properties.

First, Evidence A1 states that the false-twisting heater temperature is 130 to 210°C (Evidence A1, column 9, lines 19 to 20 in Japanese version and page 9, paragraph 2 in English version), which is, as listed in the following Table 3, within the range indicated in Step a) in Claim 8 of the Opposed Application. Also, according to Test No. 3-11 exemplified in Example 3 of Evidence A1, the heater temperature is 190°C, which is within the range indicated in Step a) in Claim 8 of the Opposed Application. That is, Step a) has been disclosed in Evidence A1 and is well known.

For the subsequent Step b), as described on page 8 of the publication specification of the Opposed Application, the twist angle of the false-twisted yarn can be determined from the denier of the false-twisted yarn and the number of twists per inch according to the following Equation (IV):

$$\alpha = \tan^{-1} \left[ \frac{2.49 \times 10^3}{\pi \times T \times \sqrt{\text{Denier}}} \right] \quad (\text{IV})$$

$\alpha$ : twist angle (°)     $T$ : number of false twists (T/inch)

Evidence A1 does not mention the twist angle of yarn, but describes that the preferred range of the number of false twists is 18750/ $\sqrt{\text{De}}$  to 32500/ $\sqrt{\text{De}}$  (Evidence A1, column 9, line 20 to column 10, line 3 in Japanese version and page 9, paragraph 1 in English version). Examples 1 to 3 provided in Evidence A1 exemplify about 75-denier and about 150-denier PTT false-twisted yarns.

A range of 44 to 60° of twist angle of the yarn can be obtained from the above values according to Equation (IV) set forth in the specification of the Opposed Application. The above range of the twist angle is within the range indicated in Step b) in Claim 8 of the Opposed Application.

Test No. 3-11 (Table 3) exemplified in Example 3 of Evidence A1 utilizes the number of false twists of 3500 T/M (88.5 T/inch). The value  $46^\circ$  of the twist angle can be obtained from 3500 T/M (88.5 T/inch) and 75 deniers (Evidence A1, column 17, line 4 in Japanese version and page 16, paragraph 1 in English version) according to Equation (IV). The above value of twist angle is within the range indicated in Step b).

Moreover, Evidence A1 does not particularly describe Step c). However, the technology of winding a false-twisted yarn on a winder is well known. The contents of Step c) cannot be deemed the technical feature. Thus, persons having ordinary skill in the art definitely appreciate that Step c) is also utilized in Evidence A1. It also means that Step c) is well known.

Table 3

Claim 8 of the Opposed Application	Evidence A1		
	Text		Table 3 of Example 3 (Test No. 3-11)
a) Feeding a partially oriented PTT yarn through a heater at 160 to 200°C	The false-twisting temperature is 130 to 210°C. The number of false twists is adjusted to a value of $18750/\sqrt{\text{De}}$ to $32500/\sqrt{\text{De}}$ .	Column 9, line 19 to column 10, line 3	190°C
b) Twisting the yarn such that the yarn has a twist angle of 46 to 52°			3500 (T/M) (number of false twists) + about 75d (yarn denier) → 46° (twist angle)
c) Winding the yarn on a winder			It is apparently utilized.

As explained above, all contents recited in Claim 8 of the Opposed Application are well known in view of Evidence A1. Claim 8 does not have novelty.

**(2-4) Claims 9 to 22 of the Opposed Application**

Claims 9 to 22 of the Opposed Application depend from Claim 6, referring to a process for producing a partially oriented PTT yarn, or from Claim 8, referring to a process for false-twisting a partially oriented PTT yarn. Claims 9 to 22 further limit the contents recited in Claim 6 or 8 or add new elements for defining the claimed scope.

As indicated above, the inventions referred to in Claims 6 and 8 are completely identical to those disclosed in Evidence A1, and thus do not have novelty. Therefore, based on the reasons identical to those for Claims 6 and 8, dependent Claims 9 to 22 undeniably do not have novelty.

As further explained below, on the basis of the limited contents or additional contents recited in Claims 9 to 22, the technical features described in the Opposed Application apparently cannot meet the requirements for patentability.

- (a) Claim 9 of the Opposed Application limits the intrinsic viscosity of a polymer for making a partially oriented PTT yarn for use in a process for false-twisting of Claim 8 and the elongation to break of the partially oriented PTT yarn to specific ranges. Nonetheless, as explained in Point (2-1) (a), the values of the intrinsic viscosity and the elongation to break have been disclosed in Evidence A1 and are well known. Thus, Claim 9 of the Opposed Application does not have novelty (see the following Table 4).
- (b) Claims 10 to 12 of the Opposed Application limit the elongation to break of the partially oriented PTT yarn obtained in the process of Claims 6 and 7 and utilized in the process for false-twisting of Claims 8 and 9 to preferred ranges.

Moreover, Claims 13 and 14 of the Opposed Application similarly limit the intrinsic viscosity of the polymer utilized in the processes of Claims 6, 7, 8, and 9 to preferred ranges.

However, as explained in Point (2-1) (a), the values of the elongation to break and intrinsic viscosity have been disclosed in Evidence A1. Therefore, Claims 10 to 14 of the Opposed Application do not have novelty (see the following Table 4).

Table 4

	Intrinsic viscosity	Elongation to break	Example 2 of Evidence A1
Claim 9	0.7 to 1.5 dl/g	110 to 145%	Intrinsic viscosity: 0.97 dl/g Elongation to break: 142%
Claim 10		120 to 145%	
Claim 11		130 to 145%	
Claim 12		110 to 145%	
Claim 13	0.9 to 1.5 dl/g		
Claim 14	0.9 to 1.2 dl/g		

Moreover, Claims 15 to 22 of the Opposed Application concretely specify the false twist device for use in the process for false-twisting of Claim 8.

- (c) Claim 15 defines that the twist insertion device is a friction spindle. However, the technology of utilizing a friction spindle in high-speed false-twisting of a synthetic fiber (e.g., polyester and nylon) is known to persons having ordinary skill in the art from 1970 (see, for example, Claim 1 of Evidence A2). Thus, the contents recited in Claim 15 are well known to persons having ordinary skill in the art, and thus Claim 15 does not have novelty.
- (d) Claims 16 and 17 define the intrinsic viscosity of the polymer and the elongation to break of the partially oriented PTT yarn. However, as explained in Point (2-1) (a), the values of the elongation to break and intrinsic viscosity have been disclosed in Evidence A1 and are well known. Thus, Claims 16 and 17 do not have novelty.
- (e) Claim 18 defines that the friction spindle described in Claim 15 comprises one entry guide disc, three to five working discs, and one exit guide disc. As clearly stated in lines 19 to 20 on page 9 of the specification of the Opposed Application, the configuration of the friction spindle "best achieves the desired result." Nonetheless, as explicitly shown in Fig. 2 provided in Evidence A2, the configuration of the friction spindle comprises "one entry guide disc, four working discs, and one exit guide disc." In other words, by comparing Fig. 2 provided in Evidence A2 with Fig.2a described in lines 18 to 20 on page 9 of the specification of the Opposed Application, it can determine that the contents recited in Claim 18

have been disclosed in Evidence A2. Therefore, the contents recited in Claim 18 have been disclosed in Evidence A2 and are well known. Claim 18 does not have novelty.

- (f) Claims 19 and 20 define the space between the discs of the friction spindle. However, as stated in lines 11 to 14 on page 9 of the specification of the Opposed Application, the space between the discs depends on the number of the working discs and is known. Therefore, the values defined in Claims 19 and 20 are obviously common knowledge to persons having ordinary skill in the art. Moreover, the friction spindle described in Evidence A2 comprises the same number of working discs as that used in the Opposed Application and thus its space between the discs is inevitably within the ranges defined in Claims 19 and 20. Consequently, the contents recited in Claims 19 and 20 have been substantially disclosed in Evidence A2 or can be easily deduced by persons having ordinary skill in the art based on Evidence A2. Thus, Claims 19 and 20 do not have novelty.
- (g) Claim 21 defines that the twist insertion device is a cross belt. However, Evidence A2 has described the comparison example exemplifying a cross belt as a friction spindle. It can be found that a cross belt is commonly used by persons having ordinary skill in the art. That is, the contents defined in Claim 21 involve common and known technology. Therefore, Claim 21 does not have novelty or an inventive step.
- (h) Claim 22 defines a step of, prior to step a) described in Claim 8, passing the yarn through a twist isolation device. However, the specification of the Opposed Application (page 9, lines 25 to 27) explicitly states that the twist stop device can be obtained from textile machine supplier such as Eldon Specialties, Inc. Graham, NC. The inventors also recognize that the twist stop device is commercial and easily available. Thus, the contents recited in Claim 22 are well known, and thus Claim 22 does not have novelty.

As explained above, Claims 9 to 22 of the Opposed Application do not have novelty or inventive step.

Given the above, the Opposed Application violates the provisions of the Patent Law, Article 19; Article 20, Paragraph 1, Item 1; and Article 20, Paragraph 2.

According to the provisions of the Patent Law, Article 41, the Opposer institutes an opposition.

Enclosures:

Enclosure 1:

Evidence A1: JP 57-193534 and the Chinese translations of page 205, column 8, second last paragraph to column 10, paragraph 1, page 206, column 12, Example 1 to column 13, Table 1, and page 207, column 16, Example 2

Enclosure 2:

Evidence A2: JP 49-013457 and the Chinese translation of Claim 1

Enclosure 3:

The specification of ROC Patent Publication No. 581833